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SP575 Storm-Damaged Residential Trees - Assessment, Care and Prevention

The University of Tennessee Agricultural Extension

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SP 575

Storm-Damaged Residential Trees: Assessment, Care and Prevention

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Snow, ice, wind, hail and even heavy rain can cause significant damage to residential trees. Understanding the impacts of storms on trees will allow you to develop both preventative measures to decrease the probability of tree damage and management approaches to care for trees after damage has occurred.

Trees may be uprooted, decapitated or suffer massive crown loss as branches are broken by the force of the wind or by the weight of ice and snow. Loss of large portions of the crown results in tree stress, a reduction of growth and entry sites for insects and disease. Depending on the degree of damage, some trees will recover on their own, others need immediate care to repair the damage incurred and some are so irreversibly damaged that they will eventually die.

Assessing the Damage

The treatment of storm-damaged trees requires prompt action and wise assessment. Factors to consider are whether the tree has damage that is relatively superficial, damage that can be treated or damage that is beyond repair. If more than 30 to 50 percent of the main branches or trunk are severely split or broken, extensive repairs are questionable.

Several types of damage occur to trees during storms. The first and most severe damage occurs when the main stem or trunk of the injured tree splits or is broken. Larger, mature trees are most susceptible to this type of the damage. Past tree injuries and pest problems often predispose the tree to storm damage by weakening the wood structure. Trees do not heal wounds. Trees can only grow over old wounds and seal them off. Wounds are structurally weaker than solid wood. Generally, if a tree has lost more than 50 percent of its crown, the probability of future survival is poor.

A second damage category is bending of young trees that occurs in ice storms or in heavy snows. The recovery of a tree to an upright position will depend on the degree of bending and the length of time the tree has remained in the bent condition. Trees bent near or past horizontal will probably not recover and should be replaced. Individual tops, or even entire trees, can sometimes be staked and tied to hasten recovery. However, the results are usually mixed. Some trees recover and others will not.

A third damage category is blow-over of trees. Often trees that blow over have root failure from a disease (root rot), from shallow soils or those with shallow hard

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Virginia Pine is highly susceptible to damage from ice storms.

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Crown damage of pecan trees following an ice storm.

pans, from soil compaction during construction or from saturated soil from excessive rainfall. For small to medium-sized, blown-over trees with at least 50 percent of the root system still in the soil, it may be possible to brace them with guy wires.

The final and least damaging category is that of broken branches where the break occurs away from the main stem. The higher the break and smaller the diameter of the break point, the higher the probability that the tree will recover. Broken branches generally do not affect tree survival unless more than 50 percent of the crown is involved. These branches need maintenance quickly so that they do not become a hazard and to decrease the risk of decay organisms entering the wounds.

Repairing the Damage

For moderate pruning jobs close to ground level, homeowners should follow these guidelines.

• Smaller branches should be pruned back to the point where they join larger ones. Make the cut at a slant next to a bud that can produce new growth. Do not leave branch stubs as they encourage rot and decay.

• Large branches that are broken should be cut back to either the trunk or main limb. Do not cut the branch flush with the trunk. Instead, cut outside the collar at the base of the branch.

• Take all necessary safety precautions! Broken limbs are often under tension and can kick back unexpectedly during cutting. Be alert for down and damaged power and utility lines and broken limbs that are hanging.

If a tree is large and the necessary work is off the ground, call a qualified arborist. Arborists have the equipment and knowledge to safely remove broken limbs and to correctly repair trees. Ideally, your arborist should be a certified arborist of the International Society of Arboriculture. A certified arborist has received training and is tested for knowledge of current technical information on tree care, repair and removal. Check references, get more than one estimate to ensure that the price offered is competitive with that offered by others for the same service and make sure that your tree service carries proper insurance for property damage, liability and workmen's compensation.

A damaged limb may strip healthy bark from the tree. To repair this type of damage, cut any ragged edges of torn bark with a sharp knife or chisel. Take care not to remove any more healthy bark and expose more live tissue than necessary. If possible, the wound left by the cut should be shaped like an elongated football with the pointed ends of the cut running vertically along the trunk or limb.

There is no need to apply tree wound dressings to prevent decay-causing infection. Research has shown that wound dressings (paint, tar and others) do not prevent decay, may interfere with rapid healing and in some cases can serve as food sources for harmful microorganisms.

Do not top trees during the repair process. Topping accelerates shoot growth and promotes branches that are weakly attached to stubs rather than anchored from within the limb. These branches are more likely to break in future storm events. The tree will also need all its resources to recover from the stress of storm damage. Removal of more branches and leaves reduces photosynthesis, the food-making process in plants, and depletes the tree's stored reserves for maintenance and growth.

Tree species susceptibility to storm and ice damage.

Susceptible	*Intermediate Resistance*	*Resistant*
Basswood	Ash – green & white	Arborvitae
Birch – river & paper	Buckeye	Baldcypress
Beech	Dogwood	Blackgum
Boxelder	Eastern white pine	Black walnut
Black cherry	Eastern redcedar	Eastern hemlock
Black locust	Hawthorn	Ginkgo
Bradford pear	Hickories	Holly
Crabapple	Loblolly pine	Linden
Elm – Chinese & Siberian	Maple – red & sugar	Kentucky coffeetree
Hackberry	Persimmon	Serviceberry
Magnolia	Red oaks	Shortleaf pine
Silver maple	Sassafras	Sweetgum
Virginia pine	Sourwood	White oaks
Willow		

Adapted from: Hauer et al. 1994 and Barry et al. 1982.

For more information on pruning trees, refer to UT Agricultural Extension Service publication PB1619, **Pruning Landscape Trees, Shrubs and Groundcovers**.

Reducing Tree Damage in Future Storms

Some trees are more susceptible to storm damage than others. Factors such as crown architecture, branch strength, brittle wood and areas weakened or injured by disease or decay should be considered when assessing the resistance of trees to future storm damage. Two approaches to reducing future storm damage to trees are species selection and proper maintenance of trees.

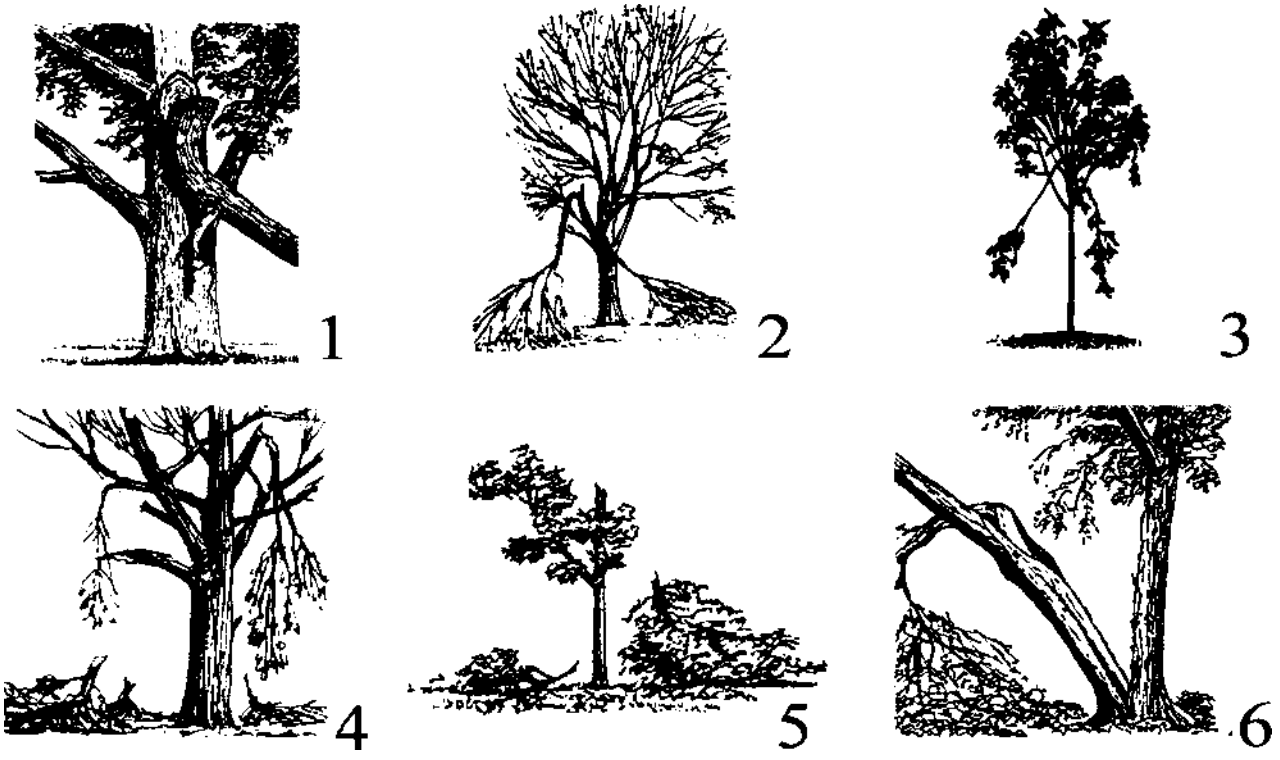
Species Selection

• Avoid selecting or planting trees with brittle wood. A few examples include Siberian elm, willows, silver maple, boxelder, Bradford pear and hackberry. The susceptibility or resistance of different tree species to storm damage is listed in the sidebar.

• Trees with upright and narrow crown forms (columnar and pyramidal) and trees with small crowns are more resistant to storm damage, particularly icing, than those with spreading, vaselike or weeping crown forms. Refer to UT Agricultural Extension Service publication SP 531, **A Palette of Tree Canopy Forms,** for information on trees with different crown forms.

• Trees with coarse branching habits (fewer and thicker branches) and lateral branches with reduced surface area are less susceptible to storm damage. Examples include walnut, ginkgo, white oak and Kentucky coffeetree.

• Trees that retain their leaves during the winter months, such as magnolia and pin oak, are more susceptible to ice damage.



1 - A mature shade tree can usually survive the loss of one major limb. The broken branch should be pruned back to the trunk. Large wounds should be closely monitored for signs of decay. **2** - Although the tree has been damaged, enough limbs remain on the tree to make saving it possible. **3** - Young trees can sustain quite a bit of damage and still recover quickly. If the terminal leader is intact and the structure for future branching remains, remove the broken branches and let the tree close over wounds and recover itself. **4** - A healthy mature tree can recover even when several major limbs are damaged. Resist the temptation to prune too heavily. With large trees, a professional arborist should be brought in to assess damage on a borderline situation, and to safely accomplish needed pruning and branch removal. **5** - This tree has lost too much of its crown. The few remaining branches can't provide enough foilage to enable the tree to survive. **6** - A rotten inner core in the trunk or structural weakness in branching patterns can cause a split trunk. The wounds are too large to ever mend and the tree has lost much of its connection between the roots and the leaves. This tree should be removed.

All drawings courtesy of National Arbor Day Foundation Illustrations.

Proper Maintenance

• Keep trees as healthy as possible with timely watering, proper fertilization and protection from soil compaction. Healthy, vigorous trees are more adaptable to changes in the environment, are more wind firm and react more effectively to damage.

• During road construction, building excavations or sidewalk replacement, avoid cutting roots or keep root damage to a minimum.

• Removal of hazardous trees is also a part of prevention. Property owners can be held liable for injuries or damage to the property of others if they fail to remove a tree that falls under reasonably foreseeable circumstances.

• Annually prune dead or broken limbs. Every three to five years, thin the excess branches to promote a well-shaped crown that develops strong branch structure. Trees with imbalanced or lopsided crowns are more liable to be damaged in a storm. Pruning on a regular basis will result in removal of structurally weak branches, a reduction in surface area of lateral branches and decreased wind resistance.

• Remove or treat pest problems to minimize potential damage that can weaken trees through decay.

• Planting trees in groups can help prevent trees from blowing down.

Of course, there is no way to completely protect trees from storm damage. Storm damage to trees can be minimized through proper species selection and care of trees. If storm damage does occur, quick action is necessary to assess the damage and initiate care for the tree.

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Ice glaze on hardwood trees. Note how the weight of the ice has bent over many young trees.

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